References

1. The Office of the National Coordinator for Health Information Technology (2014). Connecting Health and Care for the Nation: A 10 Year Vision to Achieve An Interoperable Health IT Infrastructure. Retrieved from https://www.healthit.gov/sites/default/files/ONC10yearInteroperabilityConceptPaper.pdf.
2. AHIMA Work Group. "Managing the Integrity of Patient Identity in Health Information Exchange (2014 update)" *AHIMA* 85, no.5 (May 2014): expanded web version.
3. The Office of the National Coordinator for Health Information Technology (2014). Connecting Health and Care for the Nation: A 10 Year Vision to Achieve An Interoperable Health IT Infrastructure. Retrieved from https://www.healthit.gov/sites/default/files/ONC10yearInteroperabilityConceptPaper.pdf.

THE IMPACT OF EMERGING MARKETS ON THE PHARMACEUTICAL INDUSTRY

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Emerging markets are considered nowadays the "Promised Land" for pharmaceutical industries. Although a clear-cut definition of these markets is not yet available, *Forbes* magazine along with other economists define them as developing prosperous countries. In these countries, an investment is expected to result in higher income despite the high risks. Qualifying a market as emerging is not solely based on the country's economic status but rather on a series of criteria making the definition relative to each. Jim O'Neill, retired chairman of Goldman Sachs Asset Management, coined the names of the 2 leading economies of emerging markets into 2 acronyms. BRICS countries (Brazil, Russia, India, China, and later South Africa) emerged first and were followed years later by MIST countries (Mexico, Indonesia, South Korea, and Turkey) as the second wave of tiers countries joining emerging markets. In the last 5 years, sales of pharmaceuticals in BRICS and MIST markets doubled, reaching a share of ~20% globally. This shift stems from the huge populations of the concerned societies, an increasing prosperity, and life expectancy. In addition, companies are suffering from a flattened growth rate in developed markets, the expiration of >40% of patents leading to the up-selling of cheaper generic drugs, and the existing tight regulations. However, Big Pharma needs to be cautioned regarding these emerging markets. Pharmaceutical companies wanting to expand in these emerging opportunities have to tailor their strategies according to the developing pace of each country. These communities are in need of drugs against infectious and communicable diseases such as sexually transmitted diseases. They are ready-to-exploit territories for the innovative products of pharmaceuticals. However, with the increase in wealth and longevity, a change of lifestyle is slowly taking place accompanied by a shift in the disease trends. A disproportionately fast rise in the incidence of noncommunicable diseases such as cardiovascular illnesses, diabetes, and cancers is noticed in emerging markets, mimicking the pattern of their Western counterparts. The incidence of diabetes and oncologic diseases is expected to grow by ≥20% in the next 5 years. This could be viewed as a mixed blessing, as pharmaceutical industries will be able to sell their global products in these new markets as well. Industries face challenges to conquer emerging markets grouped into 3 categories: infrastructure development, cost-containment policies, and value-driven drug evaluation. To overcome these hurdles, new strategies need to be adopted by pharmaceutical companies. Adequate tailoring and gain in market are among the top strategies to be considered.

Key words: BRICS, emerging markets, MIST, pharmaceuticals.

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MODELING AND INTEGRATION OF INTENSIVE CARE DATA INTO AN openEHR-BASED ENTERPRISE DATA WAREHOUSE

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Background: In hospitals, clinical data are often scattered across multiple databases and application systems due to decentralized clinical information system architectures. Consequently, the reuse of once collected data for secondary purposes as data analytics and data mining is considered a challenging task.[1] Enterprise Data Warehouses (EDW) have been established at several medical centers to overcome typical obstacles to data reuse such as proprietary data models, terminologies, lack of governance, and more. However, the complexity and high rate of change of the clinical domain and medical data cause high costs for maintenance of data models and the provision of data to researchers.[2] Detailed Clinical Models might help to better manage these domain-specific challenges by introducing formal and computable methods to represent clinical content models to data warehousing.[3] One example of a Detailed Clinical Model approach is openEHR, a specification of an open, interoperable electronic health record.[4] Although the use of openEHR in the context of a health information exchange is well established, there is still a lack of evidence regarding its feasibility to represent and integrate legacy data into EDWs.

Methods: We chose the domain of intensive care medicine to investigate if openEHR can meet a diverse set of requirements to represent and help integrate clinical data that are stored in application systems. At Hannover Medical School, 2 independent patient data management systems (*COPRA* and *m.life*) are incorporated at the intensive care wards. We identified a test set of 8 clinical concepts that are commonly used in these systems: blood pressure, body temperature, pulse, heart rate, indirect oximetry, Braden Scale, Glasgow Coma Scale, and ventilation. For each of these measurements, we intended to obtain an openEHR Archetype (a formal content model of a clinical concept) or to create a new one. Subsequently, Archetypes were used to create a Template, which can be thought of as a use case-specific document. For the task of data integration and mapping, we used a combination of Microsoft SSIS, Altova MapForce 2014, and the Template Document Schema approach.[5]

Results: We obtained 7 Archetypes from the Clinical Knowledge Manager, the public content model repository of the openEHR Foundation. Because no ventilation Archetype was available at the time of this work, we created a new Archetype. We found it possible to map most types of legacy data from the given application systems to openEHR Templates. The representation and mapping of Braden Scales and Glasgow Coma Scales data were straightforward. By contrast, the mapping of continuous sensor data (eg, blood pressure measurements generated by sensors) required the arbitrary segmentation of values into multiple documents. For this purpose, we chose a 24-hour interval. When integrating ventilation data, we found a high number of corresponding variables in the source systems (~300). Because available resources were limited, we decided to create a first draft version of the ventilation Archetype that only represents data elements of the most important parameters. In coordination with a clinical expert, 30 data items were identified and then modeled in the archetype.